Effect of agitation and aeration rates on chitinase production using Trichoderma virens UKM1 in 2 L stirred tank reactor

ABSTRACT

Shrimps have been a popular raw material for the burgeoning marine and food industry contributing to increasing marine waste. Shrimp waste, which is rich in organic compounds is an abundant source of chitin, a natural polymer of N-acetyl-D-glucosamine (GluNac), a reducing sugar. For this respect, chitinase-producing fungi have been extensively studied as biocontrol agents. Locally isolated Trichoderma virens UKM1 was used in this study. The effect of agitation and aeration rates using colloidal chitin as control substrate in a 2-l stirred tank reactor gave the best agitation and aeration rates at 200 rpm and 0.33 vvm with 4.1 U/l per hour and 5.97 U/l per hour of maximum volumetric chitinase activity obtained, respectively. Microscopic observations showed shear sensitivity at higher agitation rate of the above system. The oxygen uptake rate during the highest chitinase productivity obtained using sun-dried ground shrimp waste of 1.74 mg of dissolved oxygen per gram of fungal biomass per hour at the kappaL a of 8.34 per hour.

Keyword: Agitation; Aeration; Chitinase; Trichoderma virens UKM1